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Samoopažena halitoza kod diplomskih studenata medicine, dentalne medicine i zdravstvenih znanosti na Sveučilištu Sains Malaysia

Self-Reported Halitosis among Medical, Dental and Health Science Undergraduate Students at the University Sains Malaysia

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Sažetak

Svrha: U ovom se istraživanju željelo među dodiplomskim studentima Sveučilišta Sains Malaysia procijeniti broj oboljelih (prevalencija) od samoopažene halitoze i s njom povezanih čimbenika. **Ispitanici i postupci**: U ovom presječnom istraživanju rabio se upitnik kojim se procjenjivala samoopažena halitoza i s njom povezani čimbenici. Sudjelovalo je 300 studenata dodiplomske nastave, i to po 100 sa studija medicine, dentalne medicine i medicinskih znanosti. **Rezultati: S**rednja dob studenata bila je 21,7 godina (SD 1, 75), a među njima su bile i 202 (67,3 %) studentice. Kod 13 posto studenata samoopažena halitoza otkrivena je tehnikom *ruka na usta* te je njih 9,3 posto izjavilo da zadah utječe na njihove socijalne kontakte. Većina studenata (79,7 %) osjetila je neugodan vonj iz usta odmah nakon buđenja. Studenti dentalne medicine rjeđe su prijavljivali halitozu negoli oni medicine i medicinskih znanosti (OR=0,34 ; CI=0,12, 0,95), Studenti koji se redovito koriste vodicom za ispiranje usta i četkaju jezik također su rjeđe opažali halitozu. Prevalencija halitoze bila je veća među studentima s gingivnim krvarenjem i naslagama na jeziku. **Zaključak:** Halitoza je češća među nedentalnim studentima. Čimbenici povezani s tom tegobom jesu gingivno krvarenje i naslage na jeziku. Redovito korištenje vodica za ispiranje usta i četkanje jezika itekako su korisni u prevenciji halitoze. Studentima se preporučuju profesionalna njega i korištenje sredstava za oralnu higijenu.

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Uvod

Halitoza je pojam kojim se koristimo kod opisivanja neugodnog vonja u izdahnutom zraku. Ta je pojava općepoznata kao zadah, a uzroci mogu biti unutarnji i vanjski. Vanjski uzroci su konzumiranje hrane jakog okusa, poput luka, češnjaka i pojedinih začina, te duhana ili alkohola. Zadah je prolazan i obično nestaje čim se ukloni uzrok. Konstantni ili kronični zadah uglavnom je povezan s unutarnjim uzrocima – bolestima i poremećajima u usnoj šupljini, poput dubokih karijesnih lezija, parodontne bolesti ili bolesti oralne sluznice te infekcija (1). Loša higijena, te bolesti i poremećaji ostalih tjelesnih sustava, poput dišnoga, probavnog, bubrežnog i endokrinog ali i pojedini lijekovi, također su povezani s halitozom (2).

Halitoza se ne smatra samostalnom bolešću, nego je više društveni problem koji može prouzročiti osobnu nelagodu i neugodnosti. Pojedinci koji pate od halitoze, posebice stalno, mogu se osjećati nelagodno i nesigurno u blizini ostalih ljudi.

Intoduction

Halitosis is a term used to describe any unpleasant odor in exhaled air. Commonly known as bad breath, it may originate from extrinsic or intrinsic causes. Extrinsic causes include intake of volatile foods such as onions, garlic and certain spices, as well as consumption of tobacco or alcohol. The foul odor is transient and normally disappears after elimination of the cause. Persistent or chronic halitosis is more commonly associated with intrinsic factors, including diseases and disorders that affect the oral cavity, such as deep carious lesions, periodontal diseases and oral mucosal diseases and infections (1). Poor oral hygiene, diseases and disorders of other systems of the body, such as the respiratory, gastrointestinal, renal and endocrine systems, as well as use of certain medications, have also been associated with halitosis (2).

Halitosis is not considered a disease per se but rather a social problem that can cause substantial personal discomfort and embarrassment. Individuals who suffer from halitosis, particu-

Stupanj samopouzdanja može biti negativan i društvene interakcije spriječene jer pogođeni pojedinci nastoje smanjiti razgovor s drugim ljudima. U literaturi se ističe da oko 50 posto svjetske populacije ima kronično neugodan zadah iz usta (3) i od toga broja oko pet posto ima tešku halitozu (4). Kod gotovo 90 posto pojedinaca s ovim stanjem pronađena je veza s oralnim uzrocima (5), pa je halitoza jedan od glavnih razloga za odlazak stomatologu (6). Premda zadah iz usta svatko može otkriti sam *izdisanjem na usta pokrivena rukom*, mnogi nisu svjesni problema dok im to ne kažu njima bliski ljudi, poput supruga ili supruge, rodbine i bliskih prijatelja (4).

Iako je halitoza raširena po cijelom svijetu, prema našim spoznajama, u Maleziji se nije proučavala. Zato smo procijenili prevalenciju samoopažene halitoze i s njom povezanih čimbenika među studentima dodiplomske nastave Sveučilišta Sains Malaysia, točnije među studentima medicine, dentalne medicine i zdravstvenih znanosti.

Nakon diplome većina tih studenata bit će članovi zdravstvenih timova i na poslu će možda često biti u bliskom doticaju s pacijentima, klijentima i zajednicom. Studenti bi morali biti uzor ostalima, što znači im se iz usne šupljine ne bi smio osjećati zadah. Izbjegavanje halitoze pridonijet će i učinkovitoj komunikaciji s porukama zdravlja i obrazovanja.

Ispitanici i postupci

U ovu poprečnu studiju bilo je uključeno 300 studenata dodiplomske nastave na Sveučilištu Sains Malaysia. Podaci su se skupljali tri tjedna u srpnju i kolovozu 2011. Veličina uzorka određena je formulom za procjenu pojedinačne proporcije s 95 posto pouzdanosti. Na temelju rezultata dobivenih od studenata dodiplomske nastave na Stomatološkom fakultetu Sveučilišta kralja Sauda u Rijadu, u Saudijskoj Arabiji (7), procijenili smo da će prevalencija halitoze među malezijskim studentima biti 44 posto. Pretpostavili smo također da će uzorak veći od 263 studenta omogućiti preciznost od 0,6 (6 %). Radi uračunavanja 15 posto rasapa, odlučili smo se za uzorak od 300 studenata. Za odabir je korištena neproporcionalna slojevita nasumična metoda. U obzir su uzeti svi studenti od 1. do 4. godine iz zdravstvenog kampusa, osim onih koji nisu željeli potpisati pristanak ili su na završnoj godini. Na sudjelovanje u ovom istraživanju pozvano je 100 studenata medicine, 100 studenata dentalne medicine i 100 studenata zdravstvenih znanosti. Svi su potpisali pristanak. Istraživanje je odobrilo Povjerenstvo za etička (humana) pitanja Sveučilišta Sains Malaysia [(USMKK/PPP/JEPeM 236,4(1,13)].

Samoopažena halitoza procjenjivala se tehnikom *postavljanja ruke preko usta*, a provedena je prije obroka kako bi se izbjegao utjecaj mirisa hrane. Ispitanicima je rečeno da ne četkaju zube i ne upotrebljavaju pastu za zube barem osam sati prije testiranja jer okus tih proizvoda može prikriti zadah iz usta. Neposredno prije provedbe postupka ispitanici su čistom vodom temeljito oprali ruke. Nije im bio dopušten sapun s mirisom ili neko drugo sredstvo za čišćenje. Ispitanilarly the persistent type, may feel uncomfortable and self-conscious around other people. Confidence levels can be negatively impacted and social interactions inhibited as affected individuals tend to minimize direct conversations with other people. It has been reported that at least 50% of the worldwide population have chronic oral malodor (3) and 5% have severe halitosis (4). Moreover, halitosis in about 90% of individuals with this condition was found to be related to oral causes (5), with halitosis being one of the primary reasons for seeking professional dental care (6). Although foul breath can be self-detected by breathing into a cupped hand, many individuals with halitosis remain unaware of the problem until told by people close to them, such as spouses, relatives and close friends (4).

Despite the worldwide prevalence of halitosis, this condition has not to our knowledge been assessed in Malaysia. We therefore assessed the prevalence of self-reported halitosis and its associated factors among undergraduate students attending the Universiti Sains Malaysia, in particular those in the medical, dental, and health sciences courses. Upon graduation, most of these students will be members of a health care team, whose jobs may involve close and possibly frequent interactions with patients, clients and the community. The students should be motivated to be healthy role models, which includes keeping their mouths free from oral malodor. Avoidance of halitosis will also contribute to effective communication of intended health messages and education.

Material and methods

This cross-sectional study involved 300 undergraduate students attending the Universiti Sains Malaysia. Data were collected over three weeks during July and August of 2011. The sample size was calculated using the formula for estimating a single proportion for 95% confidence. Based on the results of a study of undergraduate dental students at the King Saud University, College of Dentistry, in Riyadh, Saudi Arabia (7), we estimated that the prevalence of halitosis among Malaysian students would be 44%. We also estimated that a sample size of 263 students would yield a precision of 0.6 (6%). To account for a 15% non-response rate, we decided on a final sample size of 300 students. A non-proportionate stratified random sampling method was used for sample selection. All undergraduate students in years 1 to 4 studying at the Universiti Sains Malaysia Health Campus were eligible, with students who did not give consent and those in the final year of study excluded. One hundred students attending the School of Medical Sciences, 100 attending the School of Dental Sciences and 100 attending the School of Health Sciences were invited to participate in the study. Written informed consent was obtained from all students prior to participation in the study. This study was approved by the Research and Ethics Committee (Human) of Universiti Sains Malaysia [(USMKK/PPP/JEPeM 236.4(1.13)].

Self-perceived halitosis was assessed by the hand-over-mouth technique, performed before meals to prevent interference from food odor. The respondents were instructed not to brush their teeth using toothpaste or rinse their mouth with mouthwash for at least eight hours before the test, since

ci su prekrili usta i nos objema rukama, izdahnuli normalno i pokušali osjetiti vonj iz usta. Kako bi se osigurala točnost, postupak je ponovljen tri puta.

Nakon testa izdaha ispitanici su ispunili upitnik (7) kojim se procjenjivala uočena halitoza i ostali oralni čimbenici. Prije nego što su sudionici ispunili upitnik, on je bio, kako bi pitanja bila što jasnija, testiran na 15 studenata koji nisu bili uključeni u istraživanje. Nakon toga su, na osnovi povratnih informacija, učinjene potrebne izmjene. Konačni oblik upitnika korištenog u ovom istraživanju nalazi se na slici 1. Upitnik počinje pitanjem jeste li loš zadah osjetili tijekom testa *rukama preko usta*. Problem je pobliže objašnjen dodatnim pitanjima o eventualnoj terapiji i utjecaju zadaha na društveni život. Ispitanici su opisali i svoje oralno-higijenske navike, poput četkanja zuba, korištenja zubnog konca, četkanja jezika i korištenja vodica za ispiranje usta. Potencijalni oralni uzroci halitoze određivali su se prema navikama pušenja ispitanika te uočenim oralnim problemima poput karijesa, krvarenja desni i naslaga na jeziku.

Dobiveni podaci analizirani su u programskom paketu Windows software (verzija 18,0; Statistical Package for Social Sciences - SPSS Inc, Chicago). Izračunavali su se aritmetička sredina i standardna devijacija (SD) za numeričke varijable, kao dob (godine), a za kategorijske varijable računali su se frekvencija i postotak. Hi-kvadrat test korišten je za određivanje čimbenika povezanih sa samoopaženom halitozom. Ti čimbenici također su određeni jednostavnom logističkom regresijskom analizom. Usporedili smo i utjecaj halitoze na oralno-higijenske navike dentalnih i nedentalnih studenata. Stupanj značajnosti postavljen je na 0,05.

flavors in these products may mask any oral malodor. Just prior to performing the procedure, the respondents were asked to clean their hands thoroughly with clean water. Use of scented soap or other hand cleansing products were not allowed. The respondents were told to cup both hands over their mouth and nose, breathe out normally and smell the breath from the mouth once. The procedure was repeated three times to ensure accuracy.

Following the breath test, the respondents were asked to complete a self-administered questionnaire (7) assessing perceived halitosis and the presence of associated intra-oral factors. Prior to administration, the questionnaire was pre-tested on 15 students who were not involved in the study to ensure clarity of the contents. Necessary modifications were made based on feedback. The final version of the closed-ended questionnaire used in this study is shown in Figure 1. The questionnaire begins with an item requiring each respondent to judge whether bad breath was present during the previous hand-over-mouth test. Several subsequent items explored the problem further, including questions on treatment received and interference with social life. The respondents also reported their oral hygiene practices, such as tooth brushing, flossing, tongue brushing and use of mouthwash. The presence of potential intra-oral causes of halitosis was determined by investigating each respondent's smoking habits and perceived oral health problems, such as dental caries, gingival bleeding and tongue coating.

Data were entered and analyzed using the Statistical Package for Social Sciences (SPSS) for Windows software (version 18.0; SPSS Inc, Chicago). Mean and standard deviation (SD) were calculated for numerical variables (age), and frequency and percentage were calculated for categorical variables. The chi-square test was used to determine fac-

Prikaz 1. Upitnik za određivanje samoopažene halitoze
Figure 1 The questionnaire used to determine self-perceived halitosis

1.	Stavite desni dlan pred usta i izdahnite. Imate li zadah? • Put your right palm in front of your mouth and exhale (breathe out). Do you have bad breath?			□ Da • Yes	□ Ne • No
2.	Je li vam dr. med. dent. kontrolirao zadah? • Have you ever had an examination for bad breath by your dentist?			□ Da • Yes	□ Ne • No
3.	Je li to učinio obiteljski liječnik? • Have you ever had an examination for bad breath by your physician?			□ Da • Yes	□ Ne • No
4.	Je li vas član obitelji ili prijatelj upozorio na zadah? • Have you ever been told by a family member or friend that you have bad breath?			□ Da • Yes	□ Ne • No
5.	Jeste li imali određenu terapiju zbog zadaha? • Have you ever received any treatment for bad breath?			□ Da • Yes	□ Ne • No
6.	Je li zadah posljednjih mjeseci utjecao na vaš društveni život? • In the last month, did your breath interfere with your social life?			□ Da • Yes	□ Ne • No
7.	U koje doba dana osjećate najjači zadah? (označite odgovor križićem) • At what time during the day do you feel your breath is the worst (bad breath)? (please mark the answer)				
	□ Nakon buđenja • After waking up	□ ako sam umoran • When tired	□ poslijepodne • Afternoon		
	□ ako sam gladan • When hungry	□ dok radim • During work	□ cijeli dan • All day		
	□ ako sam žedan • When thirsty	□ ujutro • Morning	□ tijekom razgovora s ljudima • While talking with other people		
9.	Četkate li zube barem dva puta na dan? • Do you brush your teeth at least 2 times every day?			□ Da • Yes	□ Ne • No
10.	Koristite li se redovito zubnim koncem? • Do you use dental floss regularly?			□ Da • Yes	□ Ne • No
11.	Koristite li se redovito vodicom za ispiranje usta? • Do you use mouthwash regularly?			□ Da • Yes	□ Ne • No
12.	Koristite li se redovito čačkalicama? • Do you use a toothpick regularly?			□ Da • Yes	□ Ne • No
13.	Četkate li jezik? • Do you brush your tongue?			□ Da • Yes	□ Ne • No
14.	Žvačete li žvakaće gume? • Do you chew chewing gum?			□ Da • Yes	□ Ne • No
15.	Pušite li? • Do you smoke?			□ Da • Yes	□ Ne • No
16.	Imate li pokvarene (karijesom oštećene) zube? • Do you have tooth decay (dental caries)?			□ Da • Yes	□ Ne • No
17.	Krvare li vam desni? • Do you have bleeding gums?			□ Da • Yes	□ Ne • No
18.	Je li vaš jezik prekriven bijelim ili žutim naslagama? • Is your tongue coated with white or yellowish deposits?			□ Da • Yes	□ Ne • No

Rezultati

Aritmetička sredina dobi ispitanika iznosila je 21,7 godina (SD 1,75), a među njima su bile 202 (67,3 %) studentice. Glavne etničke skupine bili su Malajci (48 %) i Kinezi (45,3 %). Iskustvo povezano s halitozom, oralno-higijenskim navikama i prisutnošću povezanih oralno-zdravstvenih problema, prikazano je u tablici 1. Prevalencija samoopažene hators associated with self-perceived halitosis. Factors influencing self-perceived halitosis were also determined using simple logistic regression analysis. In addition, we compared the impact of halitosis and oral hygiene practices in dental and non-dental students. The level of significance was set at 0.05.

Results

The mean age of the respondents was 21.7 years (SD 1.75), and 202 (67.3%) were female. The main ethnic groups were Malay (48.0%) and Chinese (45.3%). Perceived experiences related to halitosis, oral hygiene practices and presence of associated oral health problems, as reported by the respondents, are shown in Table 1. The prevalence

Tablica 1. Uočena halitoza, oralno-higijenske navike i oralno-zdravstveni problemi ispitanika (n=300)
Table 1 Perceived halitosis, oral hygiene practice and oral health problems of respondents (n=300)

varijabla • Variable	frekvencija • Frequency	(%)
Osjetili ste halitozu? • Perceived halitosis		
Da • Yes	39	(13.0)
Ne • No	261	(87.0)
Je li vam dr. med. dent testirao zadah? • Examined for bad breath by dentist		
Da • Yes	34	(11.3)
Ne • No	266	(88.7)
Je li vam liječnik opće medicine testirao zadah? • Examined for bad breath by physician		
Da • Yes	7	(2.3)
Ne • No	293	(97.7)
Na zadah je upozorio član obitelji i prijatelj? • Being told by a family member and friend of bad breath		
Da • Yes	16	(5.3)
Ne • No	284	(94.7)
Jeste li već liječili zadah? • Ever received any treatment for bad breath		
Da • Yes	13	(4.3)
Ne • No	287	(95.7)
Utječe li zadah na društveni život? • Breath interferes with social life		
Da • Yes	28	(9.3)
Ne • No	272	(90.7)
Dio dana kada je zadah najjači* • Time during the day when breath was the worst*		
nakon buđenja • After waking up	239	(79.7)
u slučaju gladi • When hungry	36	(12.0)
u slučaju žeđi • When thirsty	84	(28.0)
u slučaju razgovora • When talking	6	(2.0)
u slučaju umora •When tired	14	(4.7)
tijekom rada • During work	3	(1.0)
ujutro • Morning	13	(4.3)
poslijepodne • Afternoon	12	(4.0)
Oralno-higijenske navike • Oral hygiene practice		
četkanje zuba dva puta na dan • Tooth brushing twice a day	300	(100.0)
redovito korištenje zubnog konca • Regular flossing	59	(19.7)
redovito korištenje vodica za ispiranje usta • Regular mouthwash use	126	(42.0)
četkanje jezika • Tongue brushing	212	(70.7)
Oralne navike • Oral habit		
žvakanje žvakaće gume • Chew chewing gum	52	(17.3)
pušenje • Smoking	3	(1.0)
Opaženi oralni problemi • Perceived oral problems		
zubni karijes • Dental caries	106	(35.3)
krvarenje gingive • Gingival bleeding	78	(26.0)
obloženi jezik • Coated tongue	88	(29.3)

* Ukupan zbroj nije 100% jer su ispitanici odabirali više od jednog odgovora • Total is not 100% because participants might have chosen more than one answer

Tablica 2. Čimbenici povezani sa samoopaženom halitozom (n=300)
Table 2 Factors associated with self-reported halitosis (n=300)

Varijable • Variable	Samoopažena halitoza • Self-perceived halitosis				X^2 statistic* (d.f.)	*P* vrijednost • *P* value
	Da • Yes		Ne • No			
	n	%	n	%		
Spol • Sex						
muški • Male	13	(13.3)	85	(86.7)	0.009 (1)	0.924
ženski • Female	26	(12.9)	176	(87.1)		
Studij • Course						
dentalne medicine • Dental	5	(5.0)	95	(95.0)		
medicine • Medical	11	(11.0)	89	(89.0)	11.733 (2)	0.003
zdravstvenih znanosti • Health Sciences	23	(23.0)	77	(77.0)		
Redovito čišćenje koncem (flosanje) • Regular flossing						
Da • Yes	4	(6.8)	55	(93.2)	2.513 (1)	0.113
Ne • No	35	(14.5)	206	(85.5)		
Redovito korištenje vodica za ispiranje • Regular mouthwash use						
Da • Yes	8	(6.3)	118	(93.7)	8.496 (1)	0.004
Ne • No	31	(17.8)	143	(82.2)		
Četkanje jezika • Tongue brushing						
Da • Yes	19	(9.0)	193	(91.0)	10.418 (1)	0.001
Ne • No	20	(22.7)	68	(77.3)		
Žvakanje žvakaćih guma • Chew chewing gum						
Da • Yes	5	(9.6)	47	(90.4)	0.637 (1)	0.425
Ne • No	34	(13.7)	214	(86.3)		
Zubni karijes • Dental caries						
Da • Yes	17	(16.0)	89	(84.0)	1.337 (1)	0.247
Ne • No	22	(11.3)	172	(88.7)		
Gingivno krvarenje • Gingival bleeding						
Da • Yes	16	(20.5)	62	(79.5)	5.260 (1)	0.022
Ne • No	23	(10.4)	199	(89.6)		
Naslage na jeziku • Tongue coating						
Da • Yes	17	(19.3)	71	(8.07)	4.935 (1)	0.036
Ne • No	22	(10.4)	190	(89.6)		

*Hi-kvadrat test na nezavisnost • Chi-square test for independence

litoze bila je 13 posto. Oko četiri posto ispitanika zbog tog je problema već imalo određenu terapiju. Točno 79,7 posto sudionika izjavilo je da halitozu uglavnom osjeća nakon jutarnjeg buđenja. Samo troje među njima (1 %) bili su aktivni pušači. Svi ispitanici tvrdili su da četkaju zube dva puta na dan.

Čimbenici povezani s halitozom navedeni su u tablici 2. Samoopažena halitoza bila je mnogo rjeđa među studentima dentalne medicine, nego onima iz medicine i zdravstvenih znanosti (p=0,003). Kad je riječ o oralno-higijenskim navikama, studenti koji se ne koriste vodicom za ispiranje usta, niti ne četkaju jezik bili su podložniji halitozi (vodica *P*=0,004 i četkanje jezika *P*=0,001). Krvarenja iz desni i naslage na jeziku usko su povezani s halitozom (vodica *P*=0,022 i četkanje jezika *P*=0,036).

Rezultati jednostavne logističke regresijske analize čimbenika povezanih sa samoopaženom halitozom nalaze se u tablici 3. Za studente dentalne medicine vjerojatnost za uočavanje halitoze bila je znatno niža negoli kod studenata medicine i zdravstvenih znanosti (nedentalni studenti) (OR=0,34, 95 % CI: 0,12, 0,95). Halitoza je bila manje vjerojatna među studentima koji su se redovito koristili vodi-

of self-perceived halitosis was 13.0%. About 4.0% of the respondents were being treated for the problem. Among the respondents, 79.7% reported that halitosis was more noticeable after waking up. Only 3 of our respondents (1.0%) were active smokers. All respondents (100.0%) claimed to brush their teeth twice a day.

Factors associated with halitosis are given in Table 2. Self-reported halitosis was significantly lower among dental students than medical and health sciences students (*P*=0.003). As for oral hygiene practice, students who did not use mouthwash and practice tongue brushing were significantly more likely to report halitosis (*P*=0.004 and *P*=0.001 respectively). The presence of gingival bleeding and tongue coating were significantly associated with halitosis (*P*=0.022 and *P*=0.036 respectively).

Results of simple logistic regression analysis of factors associated with self-reported halitosis are shown in Table 3. For dental students, the odds of reporting halitosis were significantly lower than for medical and health sciences students (non-dental students) (OR=0.34, 95%CI: 0.12, 0.95). Lower odds of reporting halitosis were also characteristic for students who used mouthwash regularly (OR=0.40, 95% CI:

Tablica 3. Čimbenici povezani sa samoopaženom halitozom s pomoću jednostavne logističke regresijske analize
Table 3 Factors associated with self-reported halitosis by simple logistic regression analysis

Varijable • Variables		Crude OR	95% CI	*P* vrijednost • *P* value
Studij • Course				
	dentalne medicine • Dental	0.34	0.12, 0.95	0.039
	nedentalni • Non-dental	1.00		
Redovito korištenje vodica za ispiranje usta • Regular mouthwash use				
	Da • Yes	0.40	0.17, 0.93	0.033
	Ne • No	1.00		
Četkanje jezika • Tongue brushing				
	Da • Yes	0.40	0.20, 0.83	0.014
	Ne • No	1.00		
Gingivno krvarenje • Gingival bleeding				
	Ne • No	0.63	0.30, 1.33	0.228
	Da • Yes	1.00		
Naslage na jeziku • Tongue coating				
	Ne • No	0.62	0.29, 1.31	0.210
	Da • Yes	1.00		

Tablica 4. Utjecaj halitoze i oralno-higijenskih navika na studente dentalne medicine i drugih studija (n=300)
Table 4 Impact of halitosis and oral hygiene practices in dental and non-dental students (n=300)

Varijable • Variable		dentalni studenti • Dental students		nedentalni studenti • Non-dental students		X^2 statistic * (d.f.)	P vrijednost • P value
		n	%	n	%		
Zadah utiče na društveni život • Bad breath interferes with social life							
	Da • Yes	3	(10.7)	25	(89.3)	7.110 (1)	0.008
	Ne • No	97	(35.7)	175	(64.3)		
Redovito čišćenje koncem • Regular flossing							
	Da • Yes	36	(61.0)	23	(39.0)	25.329 (1)	<0.001
	Ne • No	64	(26.6)	177	(73.4)		
Redovito korištenje vodica za ispiranje usta • Regular mouthwash use							
	Da • Yes	47	(37.3)	79	(62.7)	1.539 (1)	0.215
	Ne • No	53	(30.5)	121	(69.5)		
Redovito četkanje jezika • Regular tongue brushing							
	Da • Yes	77	(36.3)	135	(63.7)	2.903 (1)	0.088
	Ne • No	23	(26.1)	65	(73.9)		

*Hi-kvadrat test za nezavisnost • Chi-square test for independence

com za ispiranje usta (OR=0,40, 95 % CI: 0,7, 0,93) i četkali jezik (OR=0,40, 95 % CI: 0,20, 0,83). Kod studenata s krvarenjem iz gingivnog sulkusa veća je vjerojatnost za nastanak halitoze (OR=0,63, 95 % CI: 0,30, 1,33) nego kod onih koji taj simptom nisu imali (OR=0,62, 95 % CI: 0,29, 1,31).

Tablica 4. pokazuje utjecaj halitoze na oralno-higijenske navike dentalnih i nedentalnih studenata. Ustanovili smo da je više nedentalnih studenata opazilo kako i koliko loš zadah utječe na njihov društveni život (*P*=0,008). I još nešto, redovito korištenje zubnog konca bilo je češće među studentima dentalne medicine (*P*<0,001). No, i dentalni i nedentalni studenti koristili su se vodicama za ispiranje usta i četkali su jezik.

0.17, 0.93) and brushed their tongue (OR=0.40, 95%CI: 0.20, 0.83). On the other hand, students with gingival bleeding and tongue coating had higher odds of reporting halitosis than those who did not have the problems (OR=0.63, 95%CI: 0.30, 1.33 and OR=0.62, 95%CI: 0.29, 1.31 respectively).

Table 4 shows the impact of halitosis and oral hygiene practices in dental and non-dental students. We found that more non-dental students reported that their bad breath interfered with the social life than dental students (*P*=0.008). In addition, flossing practice was significantly more common in dental students (*P*<0.001). Mouth wash use and tongue brushing did not differ among dental and non-dental students.

Rasprava

Halitoza je javnozdravstveni problem. Premda je prevalencija halitoze i s njom povezanih čimbenika uočena kod mnogih kulturološki različitih populacija, malo je podataka o toj tegobi u Maleziji. Ustanovili smo da 13 posto od 300 dodiplomskih studenata na Sveučilištu Sains Malaysia ima halitozu, što je niža prevalencija negoli na vroclavskom Medicinskom fakultetu (Poljska) (24 %) (8).

Ustanovili smo također da prevalencija samoopažene halitoze varira između muškaraca i žena. U nekim istraživanjima ističe se da je halitoza mnogo češća kod žena (2, 6, 9). Mi, pak, nismo pronašli značajnu razliku samoopažene halitoze kod muškaraca (13,3 %) u odnosu prema ženama (12,9 %), što je slično istraživanju obavljenom nakon pregleda studenata Stomatološkog fakulteta Sveučilišta kralja Sauda, u Saudijskoj Arabiji, gdje također nije bila znatno različita prevalencija halitoze između muškaraca i žena (7). Za razliku od naših rezultata, u istraživanju Fakulteta dentalne medicine u Bagdadu, percepcija samoopažene halitoze razlikovala se kod muškaraca (44 %) i žena (32 %) (10). To isto ustanovljeno je i u Poljskoj na vroclavskom Medicinskom fakultetu gdje je halitoza uočena kod 29 posto muškaraca i 19 posto žena.

Većina pojedinaca ne osjeća svoj dah, a na problem halitoze upozoravaju ih bliski prijatelji i članovi obitelji (11). Ustanovili smo da su 5,3 posto malezijskih studenata o problemu halitoze obavijestili članovi obitelji ili prijatelji, a kod 11,3 posto dijagnosticirao ju je liječnik dentalne medicine. Samo ih je 4,3 posto podvrgnuto terapiji. Pojedinci koji vjeruju da imaju zadah iz usta mogu početi izbjegavati društvene interakcije i odnose (7, 12). Oko 95 studenata izjavilo je da halitoza nepovoljno utječe na njihov društveni život, što je viši postotak nego u Saudijskoj Arabiji (4 – 6 %) gdje su ispitanici istaknuli da zadah nepovoljno utječe i na društvene odnose i na odnose na poslu (7). Zbog toga bi studenti s halitozom trebali potražiti profesionalnu pomoć.

Zadah iz oralne šupljine nakon buđenja uobičajen je među tim studentima i zabilježen je kod 79,9 posto ispitanika. Ovi rezultati mogu se usporediti s onima dobivenima u Bagdadu gdje je većina studenata (78 %) i studentica (62 %) navela da osjećaju halitozu nakon jutarnjeg buđenja (10). To je dosta uobičajeno jer se tijekom spavanja smanjuje količina sline, a to omogućuje proliferaciju bakterija koje otpuštaju neugodne plinove pa se osjeća njihov zadah nakon buđenja (13). Zadah zbog žeđi ili gladi navelo je 28 posto muškaraca i 12 posto žena u ispitnoj skupini. Naime, izlučivanje sline smanjuje se ako je osoba žedna ili gladna (9). To se osobito uočava kod muslimana tijekom mjeseca ramazana kada satima ne piju i ne jedu. No vonj koji pritom nastaje ne treba smatrati zadahom.

Zadah iz usta povezan je s lošim oralnim zdravljem (14). Karijes, gingivitis i naslage na jeziku pridonose halitozi (1, 2, 4, 12, 15). Krvarenje iz gingivnog sulkusa i naslage na jeziku navelo je više od četvrtine naših studenata, a ta su stanja usko povezana sa samoopaženom halitozom. I još nešto, loša higijena također je povezana s halitozom jer nakupljanje bakterijskog plaka u usnoj šupljini, primjerice u parodontnim džepovima, na površini jezika ili na aproksimalnoj po-

Discussion

Halitosis is a social health problem. Although the prevalence rates of halitosis and its associated factors have been reported across culturally diverse populations, little is known about halitosis in Malaysia. We found that 13% of a sample of 300 undergraduate students at the Universiti Sains Malaysia perceived themselves as having halitosis, a lower prevalence than that reported among students of Wrocław Medical University in Poland (24%) (8).

The prevalence of self-reported halitosis among males and females has been found to vary. Some studies found that significantly higher percentages of female subjects reported halitosis (2,6,9). In contrast, we found that self-reported halitosis did not significantly differ between males (13.3%) and females (12.9%), a finding similar to that of a study of dental students at King Saud University in Saudi Arabia, in which the prevalence of self-reported halitosis did not differ between male and female students (7). On the other hand, self-perception of halitosis was significantly different between male (44%) and female (32%) undergraduates at the College of Dentistry University of Baghdad (10). Likewise, more male students (29%) reported to have halitosis than female (19%) in Wrocław Medical University, Poland (8).

Most individuals do not smell their own breath and the problem of halitosis is frequently brought to their attention by close friends and family members (11). We found that 5.3% of Malaysian students were informed of having halitosis by family members and friends, and some (11.3%) were diagnosed by their dentist. However, only 4.3% were being treated for this condition. Individuals who believe they have bad breath may avoid social interactions and relations (7,12). About 9% of our students claimed that halitosis had interfered with their social life, a higher percentage than the 4-6% of individuals in Saudi Arabia (7) who claimed that bad breath had interfered with social interactions at work. These findings indicate that students with self-reported halitosis may require professional help.

Oral malodor upon wakening was common among these students, being reported by 79.7% of the individuals surveyed. This finding is comparable with a study in Baghdad which reported that the majority of male students (78%) and female students (62%) had halitosis after waking up in the morning (10). This is quite normal, since salivary flow decreases during sleep allowing the proliferation of oral bacteria that release unpleasant gases in awakening breath (13). Malodor due to thirst and hunger were reported by 28% and 12% of participants, respectively. Saliva production is reduced when a person is thirsty or hungry (9); this is particularly noticeable among Muslims during the month of Ramadan who abstain from drinking and eating for many hours. Odors arising from this condition, however, should not be regarded as true malodor.

Oral malodor has been associated with poor oral health status (14). Dental caries, gingivitis and coated tongue were among the factors contributing to halitosis (1, 2, 4, 12, 15). Gingival bleeding and tongue coating were reported by more than a quarter of our students, and these conditions were sig-

vršini zuba, mogu pogodovati neugodnom zadahu. Četkanje zuba i korištenje zubnog konca može smanjiti broj mikroorganizama u usnoj šupljini, pa tako i zadah. Istraživanjem među pacijentima u Kuvajtu pronađeno je da je četkanje zuba rjeđe od jedanput na dan glavni čimbenik samoopažene halitoze (OR = 2,68; 95,% CI = 1,83, 3,92; p<0,001) (2). Ispitanici u našem istraživanju – studenti medicine, dentalne medicine i zdravstvenih znanosti, imali su dobru oralnu higijenu i svi su tvrdili da svaki dan dva puta četkaju zube. Samo 19,7 posto studenata tvrdilo je da se redovito koristi zubnim koncem, što je niži postotak nego kod libijskih studenata (21 %) i zdravstvenih radnika koji kažu da ga redovito rabe (9). Ni u jednom istraživanju korištenje zubnog konca nije povezano sa samoopaženom halitozom.

Općenito, vodice za ispiranje usta smanjivale su zadah (16). Ustanovili smo da studenti koji se redovito koriste vodicom za ispiranje usta rjeđe osjećaju halitozu nego oni koji je ne upotrebljavaju. Vodice za ispiranje usta s antibakterijskim tvarima, poput klorheksidina i cetlipiridijeva klorida, mogu smanjiti broj bakterija koje stvaraju halitozu na jeziku, a vodice s kloridnim dioksidom i cinkom mogu učinkovito neutralizirati sumporne mirisne komponente (17).

Ostaci hrane, zajedno s mikroorganizmima na dorzumu jezika, i zubne naslage vjerojatno su odgovorne za više od 90 posto slučajeva halitoze (18). Četkanje ili struganje jezika pokazalo se učinkovitim u smanjenju bakterija na dorzumu jezika i tim se postupkom može smanjiti halitoza (19). Oko 70 posto naših studenata ima naviku četkanja jezika, što je povezano s rjeđom učestalošću halitoze. Slične podatke dobili su i drugi istraživači (2, 20).

Gumom za žvakanje također se može kontrolirati zadah jer žvakanjem se mehanički uklanjaju zubne naslage (21).

Moramo istaknuti da su žvakaće gume uglavnom osvježavajuće i mogu prekriti zadah. Neke imaju i aktivne komponente poput ksilitola koji također smanjuje zubne naslage (22). Premda oko 52 posto studenata u ovom istraživanju žvače gume, ta navika nije znatnije smanjila stupanj samoopažene halitoze.

Ustanovili smo da su studenti dentalne medicine rjeđe uočavali halitozu negoli studenti medicine i zdravstvenih znanosti. Zbog toga je više nedentalnih studenata izjavilo da vonj iz usta utječe na njihov društveni život. Veći postotak studenata dentalne medicine nego onih nedentalnih, naveo je da se redovito koristi zubnim koncem. Naši rezultati u skladu su s rezultatima istraživanja u Udaipuru u Indiji, gdje je ustanovljeno da je korištenje zubnog konca češće među studentima dentalne medicine (23). Također je istaknuto da je korištenje dodatnih sredstava za oralnu higijenu, kao vodica za ispiranje usta i zubnog konca, češće među studentima dentalne medicine u Poljskoj (83%) (8). Ti podaci upućuju na to da su studenti dentalne medicine motiviraniji za održavanje oralne higijene. Na njihove oralno-higijenske navike moglo je utjecati i njihovo stručno obrazovanje (24).

Budući da je za istraživanje korišten upitnik za procjenu opaženog vonja iz usta i oralnih zdravstvenih problema, rezultati se trebaju oprezno interpretirati. Ovo istraživanje može se smatrati početnim, kad je riječ o problemu halitoze u Maleziji. Potrebna su daljnja istraživanja i još objektivnije

nificantly associated with self-reported halitosis. In addition, poor oral hygiene has been associated with halitosis, as the accumulation of bacterial plaque in stagnant areas of the mouth, such as the periodontal pockets, tongue surface, and interproximal areas between the teeth, can promote the formation of malodor. Tooth brushing and flossing can reduce the number of microorganisms in the oral cavity, thereby reducing malodor. A study among Kuwaiti patients found that tooth brushing less than once daily was the factor most strongly associated with self-perceived halitosis (OR = 2.68; 95% CI = 1.83, 3.92; p<0.001) (2). The subjects in our present study, who were medical, dental and health sciences students, seemed to have good oral hygiene, as all claimed to brush their teeth twice per day on a daily basis. Only 19.7% of the students, however, claimed they regularly flossed their teeth, a percentage lower than the 21% of Libyan students and workers who reported flossing regularly (9). In neither that study nor ours, however, was flossing associated with self-reported halitosis.

In general, mouthwashes have been proven beneficial in reducing oral malodor (16). We found that students who regularly used mouthwash were less likely to report halitosis than those who did not. Mouthwashes that contain antibacterial agents, such as chlorhexidine and cetylpyridinium chloride, may reduce the numbers of halitosis-producing bacteria on the tongue, and mouthwashes containing chlorine dioxide- and zinc may be effective in neutralizing smelly sulfur compounds (17).

Oral debris, together with microbes on the dorsum of the tongue and dental plaque, are probably responsible for more than 90% of cases of halitosis in the mouth (18). Tongue brushing or tongue scraping has been shown effective in reducing bacteria on the dorsum of tongue and thereby may reduce halitosis (19). About 70% of our students brushed their tongues, a habit significantly associated with a lower rate of halitosis. Similar findings have been reported elsewhere (2, 20).

Chewing gum may also control oral malodor, in that the chewing motion may mechanically remove dental plaque (21). In addition, chewing gums normally have fresh flavors that may mask oral malodor, and some may contain active ingredients, such as xylitol, that have been shown to reduce dental plaque (22). Although about 52% of the students in this study chewed gum, this habit was not associated with a reduced rate of self-reported halitosis.

We found that dental students were less likely to report halitosis than medical and health science students. Consequently, more non-dental students admitted that oral malodour interfered with their social life. A higher percentage of dental than non-dental students flossed regularly. Our finding is consistent with the results of a study from Udaipur, India, which found that the use of dental floss was significantly higher among dental students (23). Similarly, supplementary oral hygiene products such as mouthwash and dental floss were more commonly used by the dental students (83%) in Poland (8). These findings suggest that dental students were more motivated in maintaining their oral hygiene. Their dental education may have influenced their oral hygiene practices (24).

metode za mjerenje varijabli povezanih s halitozom. Osobito se klinički oralni pregledi mogu iskoristiti za određivanje oralnoga zdravstvenog statusa, a halitoza se može dijagnosticirati komercijalnim uređajem kao što je halimetar®.

Zaključak

Ovim poprečnim istraživanjem ustanovljeno je da je 13 posto studenata zdravstvenih studija na Malezijskom sveučilištu osjetilo zadah. Problem je bio češći među nedentalnim studentima, u odnosu prema studentima dentalne medicine. Ustanovili smo da su krvarenje desni i naslage na jeziku povezane sa samoopaženom halitozom. Studenti koji se redovito koriste vodicom za ispiranje usta i redovito četkaju jezik, manje su ugroženi halitozom nego oni koji to ne čine. Dobra oralna higijena pridonosi pravilnom funkcioniranju tijela kao cjeline. Premda djelatnici u zdravstvenim zanimanjima, uključujući studente dentalne medicine, imaju veće znanje o oralnom zdravlju, uopće ga nije teško postići jer najviše ovisi o njezi pojedinca kod kuće. Profesionalna njega i motivacija za korištenje oralno-higijenskih pomagala studentima je općenito prijeko potrebna, a posebice onima nedentalnima.

Zahvala

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Since the present study used a questionnaire to assess perceived oral malodor and oral health problems, the results should be interpreted with caution. However, this study can be regarded as foundational on the problem of halitosis in Malaysia. Further studies are needed, using more objective methods to measure variables associated with halitosis. In particular, clinical oral examinations may be utilized to determine oral health status, and halitosis can be diagnosed using standard devices such as the Halimeter®.

Conclusion

This cross-sectional study found that 13% of undergraduate students in health-related courses at a Malaysian university reported bad breath. The problem was more common among non-dental than dental students. We found that gum bleeding and tongue coating were significantly associated with self-reported halitosis. Students who used mouthwash regularly and brushed their tongues had lower odds of reporting halitosis than those who did not. Good oral health and oral hygiene contribute to proper functioning of the body as a whole. Although oral health professionals including dental students may have greater oral health knowledge and skills, it is actually not very difficult to attain good oral health, which mostly depends on self-care at home. Professional care and motivation to use oral hygiene aids are required for students in general, particularly for non-dental students.

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Abstract

Objective: To determine the prevalence of self-reported halitosis and its associated factors among undergraduate students at the Universiti Sains Malaysia. **Methods:** In this cross-sectional study, a self-administered questionnaire, assessing self-reported halitosis and its associated factors, was administered to 300 undergraduate students, 100 per group in the dental, medical and health sciences courses. **Results:** The mean age of the students was 21.7 years (SD 1.75), and 202 (67.3%) were female. Self-reported halitosis by hand-on-mouth technique was reported by 13.0% of the students, with 9.3% of students reporting that bad breath interfered with their social life. Most students (79.7%) experienced their worst breath after waking up. Dental students were less likely to report halitosis than medical and health sciences students (non-dental students) (OR = 0.34, CI = 0.12, 0.95). Students who used mouthwash regularly and brushed their tongues were also less likely to report halitosis. However, the prevalence of halitosis was higher among students with gingival bleeding and tongue coating than among those without. **Conclusion:** Halitosis is more common among non-dental than among dental students. Factors associated with halitosis include gingival bleeding and tongue coating. Regular use of mouthwash and tongue brushing were beneficial in preventing halitosis. Professional care and motivation in the use of oral hygiene aids are recommended for students.

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Key words
Halitosis; Students, Health Occupations; Malaysia

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